

REMARKS

Claim 13 has been amended to essentially include the features of original dependent claim 14. Claims 14 and 16 have been cancelled without disclaimer of the subject matter contained therein or prejudice to Applicants' right to file any continuation application directed thereto. No new matter has been added. Upon entry of this Amendment, claims 1-13, 15, and 17-24 remain pending.

In the Office Action dated December 14, 2006, claims 1-10 and 12-24 were rejected under 35 U.S.C. § 102(e) as being anticipated by Maurer (U.S. Patent No. 6,691,052). Applicants respectfully traverse this rejection.

Independent claim 1 recites a method of detecting defects in a patterning device in a photolithographic process that includes "printing a reference pattern on a reference substrate using the patterning device; printing a pattern for manufacture of a device on a production substrate different from said reference substrate using the patterning device; printing a test pattern on a test substrate using the patterning device; and comparing the printed test pattern to the printed reference pattern to detect a defect in the patterning device." Maurer does not disclose or suggest all of the features of claim 1.

Maurer teaches methods for generating reference images to be used when inspecting a reticle. *See* Maurer at abstract. As discussed by Maurer, "each target structure on the sample is compared with a corresponding simulated reference structure." *See* Maurer at col. 5, lns. 54-55 (emphasis added). The simulated reference structure is generated by a recipe that includes reference images that correspond to at least some of the target structures on the sample. *See* Maurer at col. 5, lns. 24-25. The reference image is then altered to simulate one or more process effects that occur on the corresponding target structure during fabrication of the target structure. *See* Maurer at col. 5, lns. 25-29. The altered reference image is then altered again to simulate imaging effects that are introduced during imaging of the corresponding target structures during inspection. *See* Maurer at col. 5, lns. 43-45. The simulated reference image is then compared to an image of the target structure to determine if there is a difference, which may indicate that there is a defect. *See* Maurer at col. 5, lns. 55-60.

Maurer simply does not disclose or suggest a method for detecting defects in a patterning device in a photolithographic process with all of the features of claim 1. Maurer does not disclose or suggest – at least - printing a pattern for manufacture of a device on a production substrate different from the reference substrate using the patterning device,

printing a test pattern on a test substrate using the patterning device, and comparing the printed test pattern to the printed reference pattern to detect a defect in the patterning device. This is because Maurer is directed to creating simulations based on process effects when manufacturing the reticle itself and comparing a target image with the simulated image to determine if there are defects in the reticle.

Accordingly, Applicants respectfully submit that claim 1 and the claims that depend from claim 1 are patentable over Maurer, and respectfully request that the rejection to claims 1-10 and 12 be withdrawn.

Independent claim 13 recites an inspection system that includes a first inspection tool for inspecting a first pattern, a second inspection tool for inspecting a second pattern, and a device for comparing said first and second patterns, wherein the first inspection tool and the second inspection tool are configured to inspect the first and second patterns simultaneously. Maurer does not disclose or suggest all of the features of claim 13. Maurer is discussed above. Maurer uses a simulated image to compare with a target image. There is no indication that two inspection tools are used, because the simulated image does not have to be inspected. Even the discussion of conventional inspection methods in the background section of Maurer does not disclose or suggest that two inspections tools are used to inspect two patterns simultaneously.

Accordingly, Applicants respectfully submit that claim 13 is patentable over Maurer, and respectfully request that the rejection to claim 13 be withdrawn. Claim 14 has been cancelled, thereby mooted the rejection to claim 14.

Independent claim 15 recites a computer program that includes program code for instructing a lithographic projection apparatus to use a patterning device to print a reference pattern on a reference substrate and, at a later time, to use the patterning device to print a test pattern on the same reference substrate. Maurer does not disclose or suggest all of the features of claim 15. Maurer does not even disclose or remotely suggest using a lithographic projection apparatus to use a patterning device to print a reference pattern on a substrate and at a later time use the patterning device to print a test pattern on the same substrate, let alone a computer program that includes program code for instructing a lithographic projection apparatus. Instead, Maurer discloses programming an inspection system to generate a reference image and comparing that generated image with a target image.

Accordingly, Applicants respectfully submit that claim 15 is patentable over Maurer, and respectfully request that the rejection to claim 15 be withdrawn.

Independent claim 16 has been cancelled, thereby mooted the rejection to claim 16.

Independent claim 17 recites a reference substrate that includes a substrate having thereon a durable printed reference image of a pattern of a patterning device and no further patterned layers above said reference image. Maurer does not disclose or suggest all of the features of claim 17. Maurer does not even discuss the use of a reference substrate that has a durable printed reference image of a pattern of a patterning device. The target images that Maurer discusses are on the fabricated reticle itself. *See* Maurer at col. 5, lns. 16-23. Although Maurer discloses that an integrated circuit may be used instead of a reticle, it is well-known that integrated circuits do not necessarily include only one patterned layer. In fact, more often than not, integrated circuits include multiple patterned layers.

Accordingly, Applicants respectfully submit that claim 17 and the claims that depend from claim 17 are patentable over Maurer and respectfully request that the rejection to claims 17-20 be withdrawn.

Independent claim 18 recites a method of detecting defects in a patterning device of a photolithographic apparatus that includes generating a reference pattern on a first substrate using a projection beam of radiation and the patterning device, generating a pattern on a second substrate using the projection beam of radiation and the patterning device, and comparing the reference pattern on the first substrate to the pattern on the second substrate to detect a defect in the patterning device. Maurer does not disclose or suggest all of the features of claim 18.

Maurer is discussed above. Maurer simply does not disclose or suggest a method of detecting defects that includes using a projection beam of radiation and the patterning device to generate a reference pattern on a substrate and using the projection beam of radiation and the patterning device to generate a pattern on another substrate, and then comparing the generated patterns to each other to detect a defect in the patterning device.

Accordingly, Applicants respectfully submit that claim 18 and the claims that depend from claim 18 are patentable over Maurer, and respectfully request that the rejection to claims 18-24 be withdrawn.

In the Office Action, claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Maurer in view of Pietzsch et al. (U.S. Patent No. 4,692,943). Applicants respectfully traverse this rejection.

Claim 11 depends from claim 1. As discussed above, claim 1 is patentable over Maurer. Pietzsch et al. does not make up for the deficiencies of Maurer. Pietzsch et al.

discloses a method and system for inspecting a two-dimensional pattern on an object by scanning the object pixel by pixel and comparing each pixel to a pixel-by-pixel scan of a reference object. *See Pietzsch et al.* at abstract. The combination of *Pietzsch et al.* simply does not disclose or suggest a method of detecting defects in a patterning device in a photolithographic process that includes printing a reference pattern on a reference substrate using the patterning device, printing a pattern for manufacture of a device on a production substrate different from the reference substrate using the patterning device, printing a test pattern on a test substrate using the patterning device, and comparing the printed test pattern to the printed reference pattern to detect a defect in the patterning device, as claimed in claim 1. Because claim 11 includes all of the features of claim 1, Applicants respectfully submit that claim 11 is patentable over Maurer in view of *Pietzsch et al.*, and respectfully request that the rejection to claim 11 be withdrawn.

All rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited. If any point remains at issue which the Examiner feels may best be resolved through a personal or telephone interview, please contact the undersigned at the telephone number below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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